

Using GPS with an 8-TraXX and DVM

Introduction

This application note describes the use of the DVM7400/G video machine and 8-TraXX audio machine presenting multilingual audio/visual programs for tour bus applications. The system provides up to 18 mono or 9 stereo audio tracks with a video display all triggered to present local site information which is map location dependent. The power of GPS signaling is finding its way into many applications and Alcorn McBride has embraced this technology. GPS receivers are smaller and more convenient than ever before. Alcorn McBride audio visual players also use GPS receivers to trigger the playback of files in order to present location dependent content for tour vehicles.

Hardware Connections

The DVM is the GPS control unit for the system and plays the video content and a single stereo channel (left and right) of audio. The 8-TraXX is the multichannel audio play back unit that supports 8 stereo channels. The 8-TraXX is connected by RS232 using the cable supplied with the unit and is connected to the port labeled RS232. This connector is located just to the right of the volume control. The GPS mouse is connected to the GPS module of the DVM/G by the round 6-pin din connector labeled GPS. The 9-pin connector in the same module labeled Serial is an RS232 output only port used for sending data to an optional vehicle information sign. Vehicle power is supplied to both units and is standard 12-14 volts DC. The DVM7400/G have two power connectors, one round two pin connector to the far left bottom and the other is a 4-pin square Molex type connector located to the far right on the GPS module. It is not necessary connect power to both power ports.

GPS Antennas

There are three types of antennas, two magnetic (mouse) antennas and the bulkhead mount. The older type mouse antenna is dark blue with the Deluo logo on the top. This antenna will connect directly to the USB adapter when connected to the PC but will need a cable adapter to connect to the DVM or AM4.

The new type mouse antenna is black and will have the Alcorn McBride logo on top. This antenna will require the cable adapter when connected to the USB adapter because it was designed to plug directly into the back of the DVM with the /G module without the cable adapter.

You may want to use the bulkhead antenna in place of the magnetic antenna for permanent installations. This antenna will connect directly to the DVM/G.

Just a note, the USB and cable adapters are needed if you want to drive the route to enter waypoints. These adapters are needed only to interface the antennas to a PC and are not needed for normal operations.

Content

The CF card in the DVM will contain two types of files. The first type is the video files and the second are playlists. The 8-TraXX will have a CF card that will contain the MP3 audio files.

Playlists

Playlists contain commands to play files and control the player during normal operations. There are two types of playlists general and GPS. The difference between the types of playlists is the source of the triggers. GPS playlists are triggered by latitude and longitude position information which comes from the GPS antenna while general playlists are triggered by other means. The GPS playlist may be created by GPS Builder a software program available from Alcorn McBride. The software is free of charge and can be downloaded from <http://alcorn.com/support/software.html>.

The GPS playlist acts like a wakeup call to the DVM when the unit comes into the range of the waypoint set by the parameters in the playlist. The waypoints are longitude and latitude map coordinates with a range value. While the map coordinates are very specific the range parameter will provide a custom circle size to fit the tour requirements.

The range value may be set by distance from waypoint or by the speed you're traveling. The speed parameter will be translated into a distance value and placed in the tolerance field. When using distance the value will be used to calculate the size of the circle the surrounds the waypoint so all coordinates within the circle will become the trigger. When using speed the circle will change in size based on your vehicle's speed. Your speed is determined by the rate of change in the coordinates received by the GPS antenna. The slower the vehicle is traveling the smaller the ring around the waypoint will be. This will allow the content to play about the right time. For example, the slower you approach the waypoint the closer you will be to it when the content starts conversely the faster you travel toward the waypoint the earlier the content will start to play. This parameter is resolved to a numerical value that is in meters.

Building a GPS Playlist

The GPSBuilder software gives the user the ability to pick waypoints from the “Google map”. This is a nice feature when the map is detailed enough to pick the waypoints needed for your playlist. The zoom feature permits selection of waypoints within 50-100 foot resolution. The latitude and longitude coordinates will appear in the windows when

the location is left mouse button is pressed. These can then be copied to the fields in the playlist.

In some cases, the map graphics may not have the resolution or may not be detailed enough to select the needed locations. It is worth noting the resolution of the map and mouse movement can put your selected waypoint 100 feet or so off the point you intended. If this is a problem then you may use a notebook running the GPSBuilder software and drive to each location and store the location in the playlist by hitting the space bar. This entry method would require the magnetic (mouse) with a cable adapter or bulkhead GPS antenna and the Deluo USB port adapter. These two options, Google maps and GPSBuilder/PC, give you the freedom to create and edit the routes needed.

If you are familiar with the command and structure you may want to skip to the Player content section. To get started with GPSBuilder, begin by running the software and selecting the beginning operation form the startup dialog.



The options are New, Open and Open Example. The example that is supplied with the software details a basic playlist to get you started with the AM4 player. This application note will use the DVM/G in place of the AM4.

Open the example playlist “ply00001.gps” supplied with this applications note. The commands are available by dropdown menus which are opened by the button located at the right of each line in the command column. In fact, every line in each column has a control button to supply the user the needed dialog for completing the form.

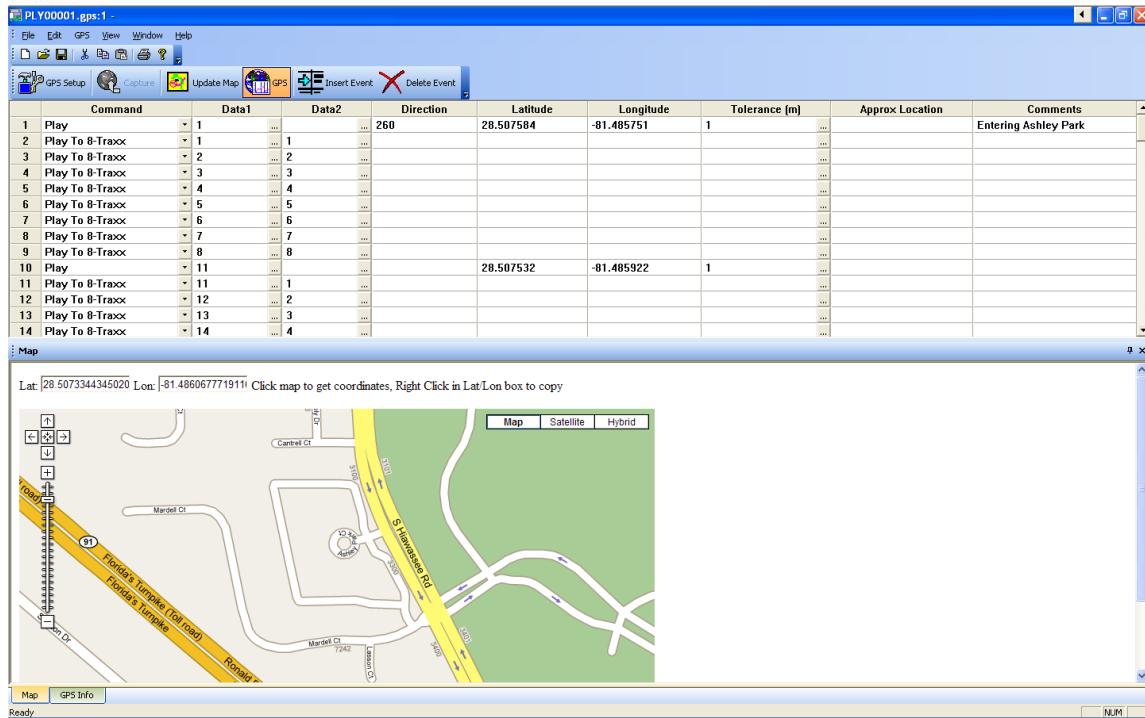
The playlist will be located on the CF card for the DVM when the system is put together. The first line will trigger the video player to play file 1 that is named “vid00001.mpg” on

the CF card. The second line “Play to 8-TraXX” will play file “1” when the vehicle is traveling in the “compass direction” of 351 degrees and within the circle center located “Latitude” and “Longitude” coordinates with its size given by the tolerance parameter.

The tolerance parameter is entered in distance, circle size in meters, or by the speed the vehicle is traveling. It is a strong suggestion to set the distance to a high number and then reduce it to the desired area. Start out with 20 or 30 meters or larger if the waypoints are not too close together. If the circle size is selected by speed set traveled speed to a high mph value then drive the tour slowly if possible to test your route. Remember the faster you set your speed the larger the circle will be and small circles will make the waypoint hard to hit every time.

Compass headings are in degrees from 0 to 360, where North is 0 or 360 degrees, East is 90, South is 180 and West is 270, so in this case the vehicle is traveling in a westerly direction. The file “1” will be played only if the direction, location and tolerances parameters are met. If Direction parameter is empty, the waypoint will be triggered from any direction the vehicle enters the circle. This parameter is useful when the route is on a boulevard or divided path where sites are on both sides and attention is given to one side or the other at a time.

The following lines show how other commands can be run to produce a show that is interactive with the progress of the vehicles path through the tour. You need only select a map location from the “Map” tab at the bottom of the window and copy and paste the latitude and longitude coordinates from the map to the playlist fields to select the waypoint. Note: The Google map may startup in a completely blue screen; this is not an error but viewing an Atlantic Ocean location. Zoom out until you see land then pan the map as needed.



Player Content

The DVM will play the video files for each site location and may play a stereo track of audio as well. If video is to be played without audio tracks, the video content must have an empty or no volume audio track present in the stream to play properly.

The 8-TraXX player content is MP3 files and may contain two different language tracks per channel if stereo audio is not required. As an example English played on the left side and Spanish on the right for channel 1. This will provide the system with up to 16 available audio selection or 18 if the audio channel of the DVM is used.

The DVM/G will detect the trigger points and send the commands to the 8-TraXX unit as required by the playlist. The playlist command “Play To 8-TraXX” will command the 8-TraXX unit to play the selected file with the waypoint is reached. In the play list for example:

The first line will trigger the DVM to play file 1 when the GPS coordinates are reached. The field labeled Data1 contains the file number. If you notice the second parameter “260”, this number is the compass direction and is an optional parameter. If it is present, the trigger will happen only when the vehicle is heading in the westerly direction when the location is reached.

The DVM will then signal the 8-TraXX to start playing the following files on the selected channels. The Data1 field contains the file number or name and Data2 field will contain the 8-TraXX channel number 1-8. All the lines under the one that has the coordinates will play until the next line with additional coordinates is found. The system will wait until the vehicle reaches the next set of parameters. When the next location is reached a new set of files will start to play.

Conclusion

At this point, we have a functioning system capable of entertaining and educating the passengers on your tour. The content can be changed to accommodate new sites and languages.